

HERPETOLOGICAL INVESTIGATIONS IN THE WESTERN GHATS, SOUTH INDIA.

PART I. THE VANJIKADAVU AND NADUKANI FORESTS, KERALA STATE

INDRANEIL DAS AND ROMULUS WHITAKER

Madras Crocodile Bank Trust, Post Bag; 4, Mamallapuram, Tamil Nadu 603104, India.

ABSTRACT: Between February and March, 1990, herpetological fieldwork in the Vanjikadavu and Nadukani forests, in Trichur district, Kerala, India, was conducted. Twenty one species of amphibians and reptiles were observed during the said period, including representatives of anurans, caecilians, testudines, snakes and lizards. Data on microhabitat, parasites, and reproduction are also presented here.

THE remarkably rich herpetofauna of the tropical moist forests of Kerala, in southwestern India, has been the subject of surprisingly few investigations, and basic biological data, needed for management and conservation, on species endemic to the Western Ghats, is still lacking.

We conducted field surveys in the Vanjikadavu and Nadukani forests of Chalakudy Division, Trichur district, Kerala, south India, between 26 February - 4 March and 20 - 26 March, 1990, as part of a larger project to collect status, distributional, taxonomic and ecological data on the amphibian and reptilian species of the Western Ghats.

There seems to have been no previous faunistic surveys of the Vanjikadavu region of Chalakudy subdivision. The area lies approximately 6 km west of the Kadar settlement of Anaipandam, and comprises primarily evergreen forests, punctuated with secondary forests, which bear scars of forest fires. Nadukani is situated approximately 8 km from Anaipandam, and comprises more intact evergreen forests. Both valleys are thought to support populations of the endemic Western Ghats testudines, *Indotestudo forstenii* and *Geoemyda silvatica*, the ecology of which was studied by the biologist J. Vijaya, in the Nadukani region, between 1983-84.

The following abbreviations have been used in the text: Snout-vent length (SV), total body length (TBL), head width (HW), straight carapace length (SCL) and straight carapace width (SCW). HW was taken at the angle of the jaws for amphibians, lizards and snakes, at the greatest width for the tortoises.

AMPHIBIA

Anura

1. *Bufo microtympanum* Boulenger (1882)

Material: Two examples, SV 3.45 and 2.53 cm, HW 1.25 and 0.9 cm. Vanjikadavu. 28 February 1990.

Ecological notes: Both examples were found at a forest clearing, near a stream, at night.

2. *Nyctibatrachus major* Boulenger (1882)

Material: One example, SV 1.73 cm, HW 0.77 cm. Vanjikadavu. 27 February, 1990.

Ecological notes: Found under a stone, along the side of a stream, on water-logged substrate.

3. *Rana beddomei* (Gunther, 1875)

Material: Six examples, SV 2.24 - 3.23 ($x = 2.64 \pm SD 0.39$) cm, HW 0.87 - 1.3 ($x = 1.03 \pm SD 0.17$) cm. Nadukani and Vanjikadavu.

Ecological notes: A very common species, especially at Nadukani, found on the dry stream bed, tree buttresses and on the forest floor, often

in association with *Rana keralensis*. When surprised under a rock, it expelled a jet of watery fluid.

4. *Rana brachytarsus* (Gunther, 1875)

Material: Five examples, SV 2.03 - 3.34 ($x = 2.43 \pm \text{SD } 0.53$) cm, HW 0.87 - 1.29 ($X = 0.996 \pm \text{SD } 0.18$) cm. Vanjikadavu. February, 1990.

Ecological notes: Found under stones in a semi-dried stream bed.

5. *Rana keralensis* Dubois (1980)

Material: Five example, SV 1.87 - 2.76 ($x = 2.27 \pm \text{SD } 0.34$) cm, HW 0.67 - 1.01 ($x = 0.89 \pm \text{SD } 0.14$) cm. Nadukani and Vanjikadavu.

Ecological notes: Appeared abundant in both localities, especially under rocks on the dry stream bed, where the substrate was moist. Some were found in typical gecko habitats such as rock clefts and tree buttresses, at night.

6. *Rana temporalis* Gunther (1864)

Material: One example, SV 1.18 cm, HW 0.41 cm. Nadukani. 2 March, 1990.

Ecological notes: The single example of this species was found under a rock on a dry stream bed. Frogs of other species (*Rana beddomei* and *R. keralensis*) were also found in the same general microhabitat.

7. *Microhylid*

Material: One example, SV 3.27 cm, HW 0.87 cm. Vanjikadavu. 25 March, 1990.

Ecological notes: A frog which belongs to a hitherto undescribed species of microhylid, was found under stones, besides a hill stream during the day. It appears to be related to the *Ramanella* - *kaloula* group of microhylids.

GYMNOPHIONA

8. *Ichthyophis peninsularis* Taylor (1960)

Material: One example, TBL 23.5 cm, HL 1.76 cm, HW 0.97 cm, primary and secondary folds 365. Vanjikadavu. 28 February, 1990.

Ecological notes: Material was found under rocks, in moist substrate, comprising of sand and gravel, near a stream, with a depth of <10 cm, with some submerged aquatic vegetation. Also found in similar situations were frogs (*Rana keralensis*, and the aforementioned microhylid).

REPTILIA

Testudines

9. *Indotestudo forstenii* (Schlegel and Muller, 1840)

Ecological notes: Four tortoises were seen during two half day searches in Nadukani between 2-3 March, 1990. Two were seen under boulders, about 2 m deep. One, a female (SCL 20.7 cm, SCW 14.24 cm), was found at dusk on a dry boulder-strewn stream bed. A male, (SCL 21.0 cm, SCW 14.63 cm) was found buried under the leaf-litter, in the forest floor, in the early part of the morning. Two unidentified ticks were recovered from the shell and under the right hindlimb of the female, no ticks were to be seen on the shell or soft parts of the male. The tick *Amblyomma geoemydae* has been recorded from the species, taken from the "Chalakudy forests", presumably the same area, by Vijaya (1983).

SERPENTES

10. *Dendrelaphis bifrenalis* (Boulenger, 1890)

Material: One example, female, TBL 79.3 cm, TL 31.6 cm, HW 1.12 cm. Vanjikadavu. 1 March 1990.

Ecological notes: The specimen was found in a reed stand near a stream, during midday, while it was chasing a *Rana beddomei*.

11. *Ptyas mucosus* (Linn., 1758)

Ecological notes: Ten adults seen and photographed at Vanjikadavu during the trip, including a copulating pair around midday, under shrubs, on a steep bank of a stream. One was seen sleeping on a fairly low branch of a tree besides a forest path, during the day.

12. *Amphiesma beddomei* (Gunther, 1863)

Material: One example, TBL 46.0 cm, SV 34.0 cm, HW 0.93 cm.

26 February, 1990. Vanjikadavu.

Ecological notes: Found under a boulder at dusk. Another example, a juvenile, TBL 42 cm, TL 10 cm, found in a dry stream bed on the night of 28 February, 1990, from the same locality has a yellow band along the nape.

13. *Ophiophagus hannah* (Cantor, 1836)

Ecological notes: An adult male, TBL 310

cm, TL 54 cm, was photographed on 28 February, 1990 on a steep outcrop, overlooking a waterhole, during late afternoon, at Vanjikadavu. Another slightly larger specimen was discovered dead in a deep natural pit by Kadar tribals at the top of large waterfall at Kundurmadu.

14. *Hypnale hypnale* (Merrem, 1820)

Material : One example, female, TBL 29.5 cm, HW 1.37 cm. Nadukani.

Ecological notes : The example was found on a low branch of a shrub, 5 cm above the forest floor, during early parts of the morning. The stomach was found to be empty. Another example was found at dusk on a rock, on a dry stream bed.

SAURIA

15. *Psammophilus blanfordanus* (stoliczka, 1871)

Material : One example, male, TBL 20.5 cm (tail-tip missing), SV 9.5 cm, HW 2.19 cm. Vanjikadavu. 4 March, 1990.

Ecological notes : The specimen was observed on a boulder during midday. The head and anterior part of the body were bright crimson, the rest intense black. Left forelimb damaged, with missing digits. Another male of this species was seen in a similar microhabitat, also with a damaged tail. Aggressive male-male encounters during the breeding season may account for the physical injuries seen on the bodies of this rock lizard.

16. *Calotes rouxii* Dumeril & Bibron (1837)

Material : Seven examples, TBL 18.5 - 22.8 ($x = 21.186 \pm \text{SD } 1.695$) cm. SV 5.3 - 6.9 ($x = 6.157 \pm \text{SD } 0.565$) cm, HW 0.96 - 1.55 cm ($x = 1.28 \pm \text{SD } 0.216$) cm. Nadukani and Vanjikadavu. 28 February, 2, 3 & 4 March, 1990.

Ecological notes : Specimens were seen on the bases of trees, on boulders near streams and in cracks on fallen tree trunks, throughout the day. Reddish-coloured mites were observed between the scales of some of these lizards.

17. *Draco dussumieri* Dumeril & Bibron (1837)

Material : One example, adult male, TBL

15.0 cm + (tail tip missing), SV 8.25 cm, HW 1.25 cm. Vanjikadavu. 23 March, 1990.

Ecological notes : Observed on a tree trunk, during the day, near a forest clearing.

18. *Mabuya beddomei* (Jerdon, 1870)

Material : Five examples, TBL 12.2 - 15.0 ($x = 13.08 \pm \text{SD } 1.108$) cm, SV 5.12 - 6.1 ($x = 5.516 \pm \text{SD } 0.473$) cm, HW 0.85 - 1.05 ($x = 0.93 \pm \text{SD } 0.094$) cm. Nadukani and Vanjikadavu. 27 February and 2 March, 1990.

Ecological notes : Examples of the species seen in forest undergrowth and sides of forest paths during the day.

19. *Leiolopisma travancoricum* (Beddome, 1870)

Material : Two examples, TBL 10.0 and 13.5 cm, SV 3.62 and 5.82 cm, HW 0.63 and 0.93 cm. Vanjikadavu. 1 and 20 March, 1990.

Ecological notes : Observed in a forested patch near stones, during the day. These brightly-coloured day-active lizards were plentiful around rocks near water-bodies during the day.

20. *Cnemaspis indicus* (Gray, 1846)

Material : One example, hatchling, TBL 3.5 cm, SV 1.67 cm, HW 0.33 cm. Nadukani. For dates, see below.

Ecological notes : A hatchling emerged on 10 March, 1990, from an egg, 0.77×0.69 cm, found under a tree buttress, half-buried in loose soil, on 2 March, 1990. Whereas it matches the description of *Cnemaspis indicus* in Smith (1935), the present example had the following characteristics (colour nomenclature and codes [#] follow Smith (1975) :

Crown warm sepia (#221A), a thin chamois (#123D) line running from the nostrils, over the eyes and meeting at the nape, where they converge and broaden, becoming darker (cinnamon, #123A) and extend over the body to the tail-tip. Sides of head and body (dark) sepia (#119), limbs (light) sepia (#219), digits banded with cinnamon (#123A). Undersurface glaucous (#80), with lighter blotches.

21. *Cnemaspis kandiana* (kelaart, 1852)

Material : Four examples, TBL 3.0-4.5 ($x = 3.87$ cm; one damaged), SV 1.52-3.1 ($x = 2.26$)

cm, HW 0.3-0.5 ($x = 0.4$) cm. Nadukani. 3 March 1990.

Ecological notes: All examples were seen on tree trunks and buttresses, about a metre from the ground. The largest specimen seen was SV 3.1 cm and had two large yolked ova. One of the four examples had a light vertebral stripe.

GENERAL REMARKS

Studies on the herpetofauna of Western Ghats continue to add new species to science (see for instance Inger *et al.*, 1984, 1984a; Pillai, 1978, 1979, 1981, 1986; Pillai and Pattabiraman, 1981; Whitaker and Dattatri, 1982). Because the region consists not of a contiguous forested area, but of valleys and ridges that are isolated from each other, a significant proportion of the herpetofauna may be endemic to the region. It is suggested that more long term studies be conducted in the area, preferably at different seasons. The list given above is clearly not exhaustive, and several other species of reptiles and amphibians were seen/heard, such as the Malabar gliding frog, *Rhacophorus malabaricus*, which was heard calling every night.

During these investigations, evidence of forest fires were seen, many of which were apparently started accidentally by the Kadar tribals themselves. The impact of this to the herpetofauna, the mammal life as well as to tree-nesting bird species, such as the great pied hornbill (*Buceros bicornis*), which was seen nesting in Vanjikadavu during the survey is obvious. A herpetological sanctuary, the 'first' for Asia, could be a way to save this relict evergreen forest and its rich herpetofauna.

ACKNOWLEDGEMENTS

The Kadar people were our hospitable and friendly guides. Dr. Garth Underwood, British Museum (Natural History) read an earlier draft of the manuscript.

REFERENCES

- INGER, R.F., H.B. SHAFFER, M.KOSHIY, R. BAKDE
1984. A report on a collection of amphibians and reptiles from Ponmudi, Kerala, South India. *J. Bombay nat. Hist. Soc.* 81(2):406-427, 81(3):551-570.
- , H. MARX, & M. KOSHY 1984a. An undescribed species of gekkonid lizard (*Cnemaspis*) from India with comments on the status of *C. tropidogaster*. *Herpetologica* 40:149.
- PILLAI, R. S. 1978. A new frog of the genus *Micrixalus* Boul. from Wynad, S. India. *Proc. Indian Acad. Sci. (animal Sci.)* 87: 173-177.
- 1979. A new species of *Rana* from Western Ghats, S India. *Bull Zool Surv India* 2(1):39-42.
- 1981. Two new species of Amphibia from Silent Valley. *Bull Zool. Surv India* 3(3):153-158.
- 1986. Amphibian fauna of Silent Valley, Kerala, S India. *Rec Zool, Surv India* 84:229-242.
- & R. PATTABIRAMAN 1981. A new species of torrent toad (Genus : *Ansonia*) from Silent Valley, S. India *Proc. Indian Acad. Sci. (Animal sci.)* 90(2):203-208.
- SMITH, M.A. 1935 The fauna of British India, including Ceylon and Burma. Reptile and Amphibia. Vol. II. Sauria. Taylor and Francis, London. 442pp.
- SMITHE, F. B. 1975. Naturalist's color guide. American Museum of Natural History, New York.
- VIJAYA, J. 1983. First report of *Amblyomma geoemydae* from India. *Hamadryad* 8(1):13.
- WHITAKER, R., S. DATTATRI 1982. A new species of *Oligodon* from the Palni Hills, South India (Serpentes: Colubridae). *J. Bombay nat. Hist. Soc.* 79(3):630-631.